

IN THE CLAIMS

Claims 1-33 (Cancelled)

34.(Currently amended) Apparatus for ray tracing through a medium having multiple variations in refractive index including:

an image information acquirer providing information relating to local refractive index variations at any multiplicity of three dimensional locations in said medium, said local refractive index variations being determined by any-either one of differential interference contrast (DIC) imaging, and phase microscopy ~~and fluorescence microscopy~~; and

a computer employing an analytically determined path of a ray through the multiplicity of three dimensional locations in the medium, for a plurality of rays impinging thereon in different directions, by utilizing said determined local variations of the refractive index at said multiplicity of three dimensional locations in the medium.

35.(Currently amended) A method of ray tracing through a medium having multiple variations in refractive index including:

determining local variation of the refractive index at any multiplicity of three dimensional locations in the medium by any-either one of the methods of differential interference contrast (DIC) imaging, and phase microscopy ~~and fluorescence microscopy~~; and

analytically determining the path of a ray through the multiplicity of three dimensional locations in the medium, for a plurality of rays impinging thereon in different directions, by utilizing said determined local variations of the refractive index at said multiplicity of three dimensional locations in the medium.

Claims 36 - 37 (Cancelled)

38.(Currently amended) Apparatus according to claim 34, and wherein said ray tracer determines an aberrated wavefront for each of said plurality of rays originating from each point in said medium; and also comprising an adaptive optics controller utilizing said aberrated wavefront to control an adaptive optical element in a ~~confocal~~said microscope, thereby to correct aberrations resulting from the variations in the refractive index.

39. (Currently amended) A method according to claim 35, and also comprising the steps of:

determining an aberrated wavefront for each of said ~~multiplicity~~ plurality of rays originating from each point in said medium; and

utilizing said aberrated wavefront to control an adaptive optical element in a ~~confocal~~said microscope, thereby to correct said aberrations resulting from said local variation of the refractive index.

40. (Currently amended) A method for confocal microscopy comprising the steps of:

providing a confocal microscope having an image information acquirer providing information relating to variations in the refractive index in a three-dimensional imaged volume, said microscope having an imaging path between a three-dimensional sample and its output image planesaid image information acquirer;

~~determining variations of the refractive index in said three-dimensional sample~~; and

disposing in said imaging path a three-dimensional medium with refractive properties that correct aberrations resulting from said variations of the refractive index in the three-dimensional sample.

41. (Previously presented) Apparatus for confocal microscopy comprising:

an image information acquirer providing information relating to variations in the refractive index in a three-dimensional imaged volume, said apparatus having an imaging path between said three-dimensional imaged volume and said image information acquirer; and

a three-dimensional medium disposed in said imaging path; wherein said three-dimensional medium has refractive properties that correct aberrations resulting from variations of said refractive index in said three-dimensional imaged volume.